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Comparing the Use of Case Studies and Application Questions in Preparing Special Education Professionals

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Abstract: *There has been growing interest and increasing use of case study (CS) materials in teacher education. Yet efforts to systematically evaluate the effectiveness of CS have been scarce. We compared instructional effectiveness of CS to another commonly used discussion strategy, an application question (AQ) method, with graduate students enrolled in a preservice teacher training course, using a repeated measures experimental design. Our specific focus was facilitation of the application of knowledge. Dependent measures included group scores on discussion guides, group discussion time, individual midterm quiz scores, and student satisfaction ratings. There were no significant differences between two discussion methods in midterm quiz scores, which was the measure of delayed application, and in the student satisfaction ratings; however, the AQ groups obtained higher scores on the discussion guides, the measure of immediate application, and took less time to complete the discussion activity than did the CS groups. Implications of these findings are discussed.*

Improved ability to apply concepts and principles to novel examples has been considered as a key indicator of instructional effectiveness (Andre, Mueller, Womack, Smid, & Tuttle, 1980; Hamilton, 1985; Wang & Andre, 1991). Likewise, transfer of acquired knowledge and skills to actual practice is an important instructional outcome for many professional training programs. For this reason, efforts have been made to enhance transfer and application of what is taught in the classroom to real life situations in higher education settings (Block, 1996; Gurman, Holliman, & Camperell, 1988). Despite consensus regarding the value of the application of knowledge, a dearth of instructional tools exist to demonstrate actual enhancement of students' application of knowledge.

Recently there has been increased interest in case studies (CS) as teaching tools among educators, especially among those in

higher education settings. According to a survey by Elksnin (1998), more than 78% of respondents in special education teacher training have used cases in their teaching. Carter (1993) argued that teachers frequently organize their knowledge in story format, including history and context information, as part of their schema for understanding teaching and student learning. Thus, stories (cases) could be an ideal medium for teaching about teaching. Similarly, Snyder and McWilliam (1999) proposed that cases can be used to cultivate application of knowledge, problem-solving, and decision-making skills in preservice teachers. CS are also presumed to have other benefits such as an increased ability to use facts and information (Velenchik, 1995), better integration of knowledge across various content areas (McWilliam, 1992), better appreciation for diverse perspectives (Snyder & McWilliam,

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1999), higher motivational value (Velenchik, 1995), and more frequent opportunities for building professional communication skills (McWilliam, 1992; Snyder & McWilliam, 1999).

Case Method Instruction is one particular way of using cases during instruction, in which students are presented with complex CS that are realistic portrayals of situations that have been or may be encountered by professionals during their actual practice (Snyder & McWilliam, 1999). Case Method Instruction was originally conceptualized at the Harvard Business School in response to the need to bridge a gap between theoretical knowledge in classrooms and actual field practice (McWilliam, 1992). Other disciplines that adopted CS include medicine (Block, 1996; Ertmer, Newby, & MacDougall, 1996), business (Velenchik, 1995), psychology (Block, 1996; Dardig, 1995), and teacher education (Griffith & Laframboise, 1998), including preservice special education training in early intervention (McWilliam, 1992; Snyder & McWilliam, 1999).

In spite of the growing interest and increasing use, efforts to systematically evaluate the effectiveness of CS have been scarce. Previous writings about the use of CS or case method are largely composed of anecdotal reports, argument papers, or qualitative appraisals about its effectiveness. Only two studies (Manouchehri & Enderson, 2003; Snyder & McWilliam, 1999) empirically examined effectiveness of the case method. However, in both studies, the effectiveness of the method was investigated with a pretest-posttest experimental design without a comparison group, making it difficult to evaluate the comparative instructional effectiveness of case method in enhancing application of classroom knowledge.

In contrast to case studies, teachers have long used questions to promote application of concepts and principles they introduce (Brophy & Good, 1985; Daines, 1986; Hamilton, 1986; Wilen & Clegg 1986). Typically, application questions (AQ) prompt learners to apply previously introduced concepts to solve problems in new situations (Daines, 1986; Wang & Andre, 1991). AQ are considered as higher level

“thinking” questions that require students to process information at a deeper level, in contrast to low level questions that only require verbatim recall or identification of previously presented information (Daines, 1986; Samson, Strykowski, Weinstein, & Walberg, 1987; Wilen & Clegg, 1986). It has been argued that effective teachers use high-level cognitive questions, including AQ (Berliner, 1984; Brophy & Good, 1985; Wilen & Clegg, 1986). Yet observations of social studies teachers across primary and secondary schools revealed that teachers use very few AQ during instruction (Daines, 1986).

Studies that actually examined instructional effectiveness of AQ have produced inconsistent and occasionally contrasting results. The effects of higher-level questions on *general achievement* of school-age children were investigated in three meta-analyses. Redfield and Rousseau (1981) reported a strong effect (mean effect size .73) of high-level questions on overall achievement, while Samson and colleagues (1987) reported a modest mean effect size of .26. Finally, in Winne’s (1979) analysis, only 15% of reviewed studies reported higher achievement with high-level questions as compared to low-level questions. The results of these reviews indicate that AQ have a modest positive effect on student achievement overall.

With respect to effects on *application of knowledge*, some studies have reported more favorable effects of AQ on application of concepts as compared to factual questions (Andre & Thieman, 1988; Felker & Dapra, 1975) or a no question condition (Wang & Andre, 1991). Others reported no advantage of AQ in application of concepts and principles (Andre & Thieman, 1988; Hamilton, 1986). Gurman and colleagues (1988) showed that, compared to control students, undergraduate students performed better on the factual question part of an exam but, interestingly, not on the application question part. From this brief glimpse of the existing literature on CS and AQ, the effectiveness of these strategies on application of knowledge is largely unknown or ambiguous, despite their widespread use.

This study was conceptualized following the action-research tradition with emphasis

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on evidence-based practice (Proctor & Renfew, 2000; Zuber-Skerrit, 1992). The primary purpose was to gain further understanding about instructional procedures frequently used in preparing special education professionals and to improve our teaching practices based on empirical evidence. With respect to CS, we expected students to apply principles taught in class to a contextualized case situation. This way of employing CS is consistent with Shulman's (1985) use of cases as *precedent* knowledge (i.e., to illustrate principles of teaching *practices*), although Shulman's discussion is primarily about the recognition of principles in the case, not specific application of principles to a case.

Method

Our study compared effects of CS to those of AQ when used as a group discussion facilitation strategy during small group discussions in a graduate-level special education preservice teacher training course. We examined whether there were differences in students' ability to apply knowledge as a result of participation in the structured group discussion activities using two different facilitation methods. Specifically, this study was conducted to address three questions: (a) Does a group discussion strategy using CS produce application of information in the reading and lecture materials that is superior to that of AQ?, (b) Is there a difference in instructional efficiency between the two group discussion facilitation strategies?, and (c) Is there a difference in student satisfaction between the two strategies?

Participants

Study participants were 12 students enrolled in a graduate level educational psychology course in a large urban Midwestern university. They comprised 100% of students enrolled in the class during the term. The profile of the participants was typical of students enrolled in master's level special education courses of the university. The majority of participants were women (92%), in comparison to the 90 to 95% women enrolled annually in the special education program. Most participants were graduate students (92%) due to the fact that the special

education program is a graduate degree program; one participant was a continuing education student. Participants were mainly special education majors (75%). Typically, one student from communication disorders enrolls; however, three students from communication disorders enrolled this term. Our participants spanned age ranges, with 42% in their 20's and 58% 30 years and older. This represents the normative student body in our special education program because some students enter immediately after their undergraduate program and others return for special education licensure after working in other areas of education. Most participants were seeking license in developmental disabilities (58%) and had more than three years of experience with individuals with disabilities (83%) or with persons with sensory impairments (75%). It is usual for our teacher trainees to have prior experience with disabilities because prior experience is one of the factors considered in admission. Lastly, most participants maintained a grade point average (GPA) between 3.51 and 4.0 (58%); one student (8%) had a GPA between 3.01 and 3.5, and four (33%) declined to answer.

Context

The graduate level course that served as the instructional context for this study was a required course for the special education teacher licensure program in developmental disabilities and was taught by the third author. The major objectives of the course were to (a) increase knowledge about medical aspects of and terminology related to hearing and vision impairments of students with multiple disabilities, (b) build skills of developing and/or adapting appropriate assessment methods for sensory impairments, and (c) promote abilities in design and implementation of instructional strategies for learners with sensory impairments.

Study Design and Procedures

We used a repeated measures design (Wiersma, 1995) to assess instructional effectiveness of two different small group discussion facilitation methods—one with CS and one with AQ. First, after giving informed consent and completing the demo-

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graphic information sheet, participants were randomly assigned to one of four discussion groups of three members each. This assignment was stratified by students' experiences so that each group included both students with more extensive experiences and those with fewer experiences. Students' experiences with individuals with disabilities or sensory disabilities were comparable across groups to ensure fair comparison. The membership in each discussion groups was constant throughout the experiment. Each group received treatments of both instructional strategies, but the sequence of instructional treatments was assigned randomly to groups and counterbalanced across groups.

Treatments were implemented in two of the course modules (i.e., a visual impairment module and a hearing impairment module) during small group discussion periods by providing either CS or AQ written discussion guide. Both modules were planned and delivered in parallel. Each module was 3-weeks long and the following topics were presented in sequence, one topic per week: characteristics of learners, assessment tools, and instructional strategies. Group discussions were implemented during the last two weeks of each module. Two groups used the AQ discussion guides for the first module and the CS discussion guides for the second module; the other two groups used a CS guide first and an AQ guide second. We chose to present treatments to participants this way in order to (a) strengthen potential treatment effects by repetition within the same module and (b) increase treatment discrimination by participants by associating instructional modules with the treatment type.

At the beginning of each group discussion period, groups were provided with their respective discussion guides. Only one discussion guide was provided to each group to increase the likelihood of group cooperation (Johnson & Johnson, 1980). Students were then instructed to work as a group to read the discussion guides, discuss possible answers and solutions to prompt questions, and provide a summary of group discussion in the space provided within a 30-min time period. This written summary was collected at the end of discussion period and scored as described later in this paper. To gather ad-

ditional information about instructional *efficiency* of the treatments, the groups were also instructed to record the time taken to complete the group discussion activities. While the groups were engaged in discussion, the first author circulated among them and clarified any questions about general task expectations and the intention of the questions, but not about specific content of responses. At the end of the second week of intervention in each module, each participant also completed a satisfaction survey to reflect on the group activities.

Treatment

We developed two types of discussion guides, CS and AQ for each training module (i.e., the visual impairment module and the hearing impairment module). Each discussion guide had two parts, one for the assessment topic and one for the instruction topic. These two parts were given to the groups on successive weeks.

Case Studies

Each part of the CS group discussion guide was composed of a 1-page length case description and three related discussion questions. Case descriptions were either written or adapted from existing textbooks (e.g., Berg, 1987) by the authors. Case descriptions were fictional but plausible scenarios, and they were written from a perspective of a special education teacher who faced a situation requiring planning for assessment or instruction to address hearing or visual impairments of students with multiple disabilities. Case descriptions included contextual information (e.g., setting, background), descriptions of characteristics of stakeholders (e.g., student, parent, teacher) and interaction among stakeholders, and description of a situation needing further action from the special educator. The discussion questions for the CS discussion guides were related to the case description and to the class topic (i.e., assessment or instruction). Specifically, the discussion questions asked each discussion group to construct plans for assessment of different aspects of sensory impairments or to design instructional strategies and environmental supports accordingly.

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We chose this method of CS because (a) we believe that teacher educators often use short case studies to structure small group discussions, as evidenced by case presentations in textbooks, and (b) we wanted to construct comparable experimental conditions to AQ comparison. The way we used case studies was different from the method commonly described as Case Method Instruction in that (a) case descriptions were fictional accounts and relatively brief, (b) case description and respective discussion questions required answers with limited divergent possibilities in direct relation to information presented previously through readings and lectures, and (c) there was no direct in-person facilitation by the instructor.

Application Questions

Each part of the AQ discussion guides presented three similar questions as those given in the CS guides but *without* the case description. To achieve tight comparison between the two instructional methods, the two types of guides were constructed in a parallel fashion in content, the number of questions included, and response requirements. (e.g., space provided to write summary of group responses). For example, one of the discussion questions for CS was "Consider the background of May's visual impairments (cause, type, history) and classroom environments at Seewellville Elementary. How do you propose to modify the classroom/school environment to Mr. Allinckle and the Principal?" The matching discussion question for AQ was "List strategies to enhance visual qualities of a general education classroom in an elementary school."

Instrumentation

At the end of discussion period the completed discussion guides, with written summaries of group discussion, were collected as a measure of students' immediate application of factual information covered during lectures and readings. We used two slightly different scoring systems depending on response requirements. Some prompt questions in the guides asked groups to provide only appropriate responses to the questions, whereas other questions required groups to provide

additional justifications or examples of each response. Responses that did not require justifications or examples were scored with the following three criteria: (1) presence of response, (2) relevancy, and (3) accuracy. For instance, one response to the prompt question "List strategies to enhance visual qualities of a general education classroom in an elementary school" was "individual lighting." Because this response met all three criteria, it earned an overall score of three. If the same group provided 6 additional responses to the same question and all 7 responses were relevant and accurate, the group could earn a score of 21 for this question. When prompt questions required responses with justifications or examples, two additional criteria were added when scoring group responses: (4) number of justification or examples for each response and (5) relevancy of justifications or examples.

Using these criteria, the first and the second authors independently scored half of all completed discussion guides across types of discussion guides, modules, and sessions. The modified point-by-point method was used to calculate interrater agreement. We defined a 'point' as an opportunity to earn a score of 1 for each criteria for each response. Occasionally, groups provided more than one justification/example for each response. In this case, each justification/example was considered as a point for agreement check. Interrater agreement was then calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying it by 100. The mean interrater agreement was 97% with range of 94–100%.

Two take-home midterm quizzes were generated by the authors to assess the effects of the two different discussion methods. Each quiz was composed of two parts. Part 1 included 8 short answer questions to measure students' acquisition of factual information and Part 2 included a combination 3 short answer and 2 essay questions, together with a case description, to measure students' delayed application of factual knowledge to the case description. Students were instructed to complete the quizzes individually and not to discuss their responses each other. Part I of the quizzes was scored by the third au-

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thor, the instructor of the course, with an 8-point maximum. Part 2 was scored using the same criteria as those used for group discussion guides, with an additional sixth criterion of whether each response was accurate interpretation of the case description given. There was no limit in maximum possible points for Part 2. One third (33%) of Part 2 responses was scored by two raters independently and interrater agreement was calculated using the same procedures as those for the discussion guides. The mean interrater agreement was 93% (range 87–99%).

Participants' perceptions and preferences of the two discussion methods were measured with a researcher-constructed satisfaction survey. There were a total of six items in the survey; three items were designed to tap student satisfaction with discussion activities (i.e., amount learned, appropriateness for the topic, interest) and three items assessed the quality of the written discussion guides (i.e., helpful for group discussion, clarity in directions, facilitation of group discussion). For each item, participants indicated their evaluations on a 5-point Likert-type scale ranging from (1) almost nothing, (3) generally, to (5) exceptional. The internal consistency of the survey (i.e., Cronbach's alpha) was .71.

Data Analysis

Dependent variables for the study included scores from the written summaries of group discussion activities (i.e., immediate application), group discussion time, midterm quiz scores for the factual part and the case application part (i.e., delayed application), and ratings from the satisfaction surveys. Among these, scores from the written summaries of group discussion activities and group discussion time were group-level data, whereas scores from the midterm quizzes and ratings from the satisfaction survey were individual participant data. Two composite scores were derived from the student satisfaction survey for statistical analysis. Ratings from the three items about the discussion activities were aggregated to produce one composite score for satisfaction with the group activity. Similarly, ratings from the three items about the written discussion guides

Table 1. Group Scores from Group Discussion Guides (Immediate Application) and Discussion Time

Group	Scores from Discussion Guide		Discussion Time	
	CS ^a	AQ ^b	CS	AQ
1 (N=3)	110	152	55	48
2 (N=3)	110	162	56	45
3 (N=3)	137	196	45	40
4 (N=3)	115	157	45	46
Mean	118.00	166.75	52.50	44.75
SD	12.88	19.92	6.08	3.40

^a Case Study; ^b Application Question

were aggregated to produce a composite score for satisfaction with the written guide. Due to the small number (N = 4) of groups included in the study, only descriptive statistics are provided for group level data. For individual level scores, we used a nonparametric statistical analysis of Wilcoxon Signed Ranks Tests to test differences between two related means. An alpha level of .05 was used for all statistical tests.

Results

Compared to CS guides, AQ guides fared favorably regarding group scores from the written summaries (i.e., immediate application) of group discussions and instructional time. Table 1 shows group scores and discussion times that each group recorded, summed across two sessions within the same module. All four groups produced written summaries with higher scores when using AQ discussion guides (M = 166.75) than when using CS guides (M = 118.00). Moreover, groups were able to complete discussions in a shorter amount of time when provided with AQ guides (M = 44.75 min) than when provided with CS discussion guides (M = 52.50 min), an average of 8 mins faster. Three of the four groups were more efficient with AQ guides than with CS guides.

The findings from the group discussion activities that favored the AQ condition were not replicated in individual scores from the midterm quizzes. Mean scores, standard deviations, and range for midterm quizzes and the composite scores from the satisfaction

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Table 2. Students' Performance from Mid-term Quizzes and Students' Ratings on Satisfaction Survey

Measure		Discussion Guide	
		Case Study	Application Question
Quiz			
Factual	M	7.50	7.67
	SD	0.37	0.44
	Range	7.0–8.0	6.5–8.0
Case Application	M	95.58	107.17
	SD	10.39	27.92
	Range	71–110	72–174
Survey ^a			
Activity	M	10.25	11.17
	SD	1.60	2.08
	Range	7–12	8–14
Written Guides	M	9.75	11.00
	SD	1.82	2.05
	Range	7–12	6–14

^a Survey scores are composite of rating of 3 items in each category; each item was rated on a 5-point Likert type scale ranging from (1) almost nothing, (3) generally, to (5) exceptional.

survey are reported in the Table 2. There were no significant differences between two methods in the results of Wilcoxon Signed Ranks Tests in either the factual ($Z = -.973$, $p = .33$, $\eta^2 = .079$) or the application parts ($Z = -1.138$, $p = .26$, $\eta^2 = .108$) of the quizzes. Likewise, there were no significant differences in student satisfaction for the group activities ($Z = -1.670$, $p = .10$, $\eta^2 = .232$) or for the written discussion guides ($Z = -1.499$, $p = .13$, $\eta^2 = .187$).

Discussion

We examined the effectiveness of two different group discussion facilitation strategies, one with the CS and the other with AQ, with graduate students enrolled in a special education teacher licensure course. The results indicated that the CS group discussion facilitation strategy did not result in greater application of knowledge compared to the AQ strategy. Participants in both treatment conditions performed similarly in mid-term quizzes in terms of both factual acquisition and in application of facts to new case scenarios. Additionally, participant satisfaction with the discussion formats and written

discussion guides was not different with respect to treatment conditions. There is tentative evidence that use of CS may not be as efficient nor effective in facilitating small group discussions as AQ, as shown in longer group discussion time and lower group scores obtained in completed summaries of the group discussion. However, this finding should be interpreted cautiously within the instructional context used in our study.

Several explanations are possible for the similar performance between the two treatment conditions on the midterm quizzes. The most straightforward explanation is that CS and AQ are comparable in facilitating application of acquired knowledge. Gurman and his colleagues' (1988) reported that, while utilization of AQ did increase retention of factual information, it did not enhance the application of the concepts to new situations. CS may have similar instructional effects. It is interesting that the CS treatment did not result in comparative advantage either in the factual or in the application part of the mid-term quizzes given the similar task structures between the CS treatment and the case study part of midterm quizzes; both involved interpretation of information presented in the given case description. The limited potential of the case method in application was also noted by Kreck (1992). He cautioned that certain cases may not be sufficiently effective in promoting application, particularly to actual field practices, due to such inherent characteristics of "book" cases (vs. "live" cases) as limited realism and complexity.

Previous authors (McWilliam, 1992; Valenchik, 1995) have suggested that a particular type of using case studies, Case Method Instruction, would be more effective when case descriptions were complex and open to many possible alternative actions, requiring learners to incorporate knowledge from several different content areas and to use problem-solving, communication, and interpersonal skills, akin to the model at Harvard Business School. Reflecting this, our procedures may not have utilized CS in a way to fully demonstrate its presumed advantages of promoting higher and more complex application skills. First, our case descriptions may not have been sufficiently complex or open-ended. The desired responses to

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questions of case descriptions used during group discussions and midterm quizzes were not highly ambiguous; some answers were more obviously correct than others. Second, the contents and objectives of the course may not have provided optimal conditions to demonstrate comparative effectiveness of instructional method using case studies. That is, major course objectives of this study focused on acquisition of factual knowledge (e.g., medical terminology) and application of the information to limited assessment and instructional design situations. It has been suggested that Case Method Instruction may be more effective in courses with objectives that address students' attitudes toward certain topics or values clarification (Snyder & McWilliam, 1999), which we did not examine in our study. Third, application and problem-solving skills, the presumed benefits of the case method, may need a long-term exposure to bring any notable changes. In contrast, our study applied CS across only two weeks for each instructional module.

Lastly, the lack of difference may be due to our specific participants. The majority of participants were graduate students with relatively high GPAs who had rather extensive experience with disabilities. Different instructional methods, especially when applied in a short period like our study, might make little difference to learners who are already effective (Casteel, 1993; Oakhill & Yuill, 1996; Wilen & Clegg, 1986). Also, this study included only a small number of participants, which may not have provided response variation sufficient enough to detect small differences between the two methods.

We did not expect that the AQ treatment would result in consistently higher scores on the completed summaries of group discussion. The existing literature provides little basis to explain this finding. Group discussion time may be related to this finding; the AQ treatment groups may have used the group discussion time more effectively, developing relevant ideas and recording them, in lieu of using the time to read case descriptions and to find relevant features among members as required by the CS treatments. Another possibility is that, because the application questions were presented in an open manner with no contextual constraints

(unlike case descriptions), the AQ treatments may in fact have been more conducive to bringing up diverse yet relevant ideas among members, especially when used in small group discussion situations. The fact that the advantages of the AQ treatment were not repeated in the midterm quizzes could also be explained by these accounts. When completing midterm quizzes, students were given an unlimited amount of time but without support of a diversity of ideas from group members. Therefore, under the absence of two potentially favorable conditions to the AQ treatment, the students may have not demonstrated superior scores on quizzes in comparison to the CS treatment.

Consistent with existing concerns (Elksnin, 1998), the CS treatment groups took more instructional time to read the case description and discuss the questions. Anecdotally, it took more preparation time on the part of instructors to design and construct case descriptions. The absence of high quality case materials has been a consistent concern (Elksnin, 1998; Kreck, 1992; McWilliam, 1992). In addition, we didn't observe comparative effectiveness of the CS treatment condition in our participants to the AQ condition in terms of facilitation of application skills and higher motivational value, as argued by existing literature (Valenchik, 1995). In fact, the AQ treatment produced better group responses as reflected in higher scores in written group discussion summaries.

Future studies need to explore some of these issues. For instance, it will be important to examine the impact of longer-term implementation of CS. More critically, considering the reported positive association between students' written responses to case vignettes and student teaching evaluations (Herman, 1998), the presumed facilitative role of CS in connecting classroom knowledge to actual field practices, not just to other simulations, needs to be studied. Also, we need to know potential differential effects of CS in terms of types of target skills (e.g., information application vs. interpersonal skills) and knowledge (e.g., value vs. concepts) by learners' ability levels or learning styles (Elksnin, 1998). Lastly, far less known than the effectiveness of CS is our under-

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standing about the process by which cases work. Block (1996) and Carter (1993) conjectured about the connection among the quality and quantity of episodic knowledge, (teacher) expertise, and case descriptions. If we know more about mechanisms of processes involved with case method, we may be able to design more effective use of CS.

Implications for Practice

The findings obtained from this study have practical implications for teacher educators. When choosing instructional strategies, teacher educators need to consider a variety of factors, such as course objectives, nature of instructional topics, and available time, and choose different instructional strategies that are appropriate for a particular instructional context. For example, in instructional situations in which many different topics need to be covered within a limited period of time or in which a more objective, conclusive, or convergent topics are covered like in our study, the application question method may be a good instructional strategy to facilitate application of factual information due to its time-efficiency. In contrast, the results of our study and extant literature suggest that, when instructional goals involve values clarification, appreciation of multiple perspectives, or complex problem-solving, the use of case studies may be considered. Separately, when working with adult students with extensive prior knowledge and pertinent experiences, different instructional methods can be used interchangeably with comparable results in knowledge application and student satisfaction.

Implications for Teacher Education and Policy

This study also has implications for university and college faculty who prepare future teacher educators. That is, knowledge about different instructional contexts (e.g., nature of instructional objectives, characteristics of adult learners) and differential selection of instructional strategies may need to be an explicit part of training programs for future teacher educators.

Recent national policy around teacher quality calls for improved accountability in

teacher preparation (American Association of College for Teacher Education, 2004). This study offers one example of research teacher educators could implement to inform their work and document their effect. Teacher educators who use systematic evaluation of their instruction to improve practice create and participate in evidence-based professional practice (U.S. Department of Education, 2003).

It is worth noting that the topic of the current study, application-focused content discussion, also has particular implications for national accreditation of teacher education programs. According to the latest edition of professional standards, accreditation by the National Council for the Accreditation of Teacher Education is based on a unit's capability to assess the performance of teacher candidates around their knowledge, skills, and dispositions (National Council for Accreditation of Teacher Education, 2002). Discussion-based instruction can be used to facilitate learning and elicit-responses that demonstrate knowledge, communicate dispositions, and suggest skills. Future research and systematic evaluation should investigate the most effective uses of discussion to achieve learning goals in each of these areas.

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